

CLAIMS

I claim:

1. An electrode comprising
 - 5 a housing containing a bed of carbonized charcoal powder having a proximal, distal and at least one side surface;
 - a moveable piston in contact with said proximal surface of said bed for applying compressive force to said bed to compress said bed sufficiently to reduce the resistivity of said bed to less than about 1 ohm-cm;
 - 10 at least one electrical contact with said bed to conduct electric current flow into or out of said bed;
 - a device for applying a force to said moveable piston sufficient to cause surface pressure against said bed of at least about 1 Mpa;
 - 15 and a porous wall in contact with said bed to conduct liquid or gaseous electrolyte to and from said bed.
2. An electrode according to claim 1 wherein said charcoal powder is carbonized at a temperature of 900 °C or more for a period of at least several minutes.
- 20 3. An electrode according to claim 1 wherein said charcoal powder comprises a substantial portion of particles having a size of 1 mm or less.
4. An electrode according to claim 1 comprising two opposing pistons that apply force to said bed of carbonized charcoal powder respectively on said proximal and said distal surfaces.
- 25 5. An electrode according to claim 1 wherein said electrical contact is made with said distal surface of said bed.
6. An electrode according to claim 1 wherein said electrical contact is made with said side surface of said bed.
7. An electrode according to claim 1 wherein said electrical contact is made with
- 30 said proximal surface of said bed through said piston.
8. An electrode according to any of claims 5, 6 or 7 wherein said electrical contact is attached to a source or sink of electrons through an electrically conducting wire.

9. An electrode according to claim 1 wherein said porous wall comprises said piston
in contact with said proximal surface of said bed.
10. An electrode according to claim 1 wherein said porous wall is in contact with
5 said distal surface of said bed.
11. An electrode according to claim 1 wherein said porous wall is in contact with
said side surface of said bed.
12. A method for forming a carbonized charcoal powder electrode comprising
the steps of
10 i) loading carbonized charcoal powder which has been carbonized at a
temperature above about 900° C into an apparatus having at least one
electrical contact with said powder for providing flow of electricity to or from
said powder
and said apparatus being adapted for communication of an electrolyte with
15 said powder; and
ii) applying a compressive force to said powder in said apparatus
sufficient to form a compressed bed wherein said bed is characterized by a
resistivity of less than about 1 ohm-cm.
- 20 13. A method according to claim 12 wherein said compressive force is at least
about 1 MPa.
14. A method according to claim 12 wherein said resistivity is less than about 0.5
ohm-cm.
15. A method according to claim 12 wherein said carbonized charcoal powder
25 comprises a substantial portion of particles having a size of 1 mm or less.
16. A method according to claim 12 wherein said electrical contact is attached to a
source or sink of electrons through an electrically conducting wire.